the PV's in the current study was: LIPV 0.68±0.12 m/s, LSPV 0.49±0.08, RIPV 0.43±0.08, RSPV 0.48±0.09. Conclusions: Intracardiac echocardiography provides real time, easily obtainable measurements of PV size and PV flow velocity. There is considerable variation in PV ostial size using different imaging techniques, suggesting that further comparative studies in patients with AF are needed.

1189-65 Measurement of Scatterer Density Using High Frequency Intracardiac Ultrasound Discriminates Normal From Reperfused Infarcted Myocardium

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Background: Ischemia/reperfusion results in structural changes (contraction bands, hemorrhage, edema) which may cause a change in myocardial scatterer density resulting in a variation in the distribution of backscattered ultrasound echoes from the myocardium. Using high-resolution intracardiac ultrasound (ICE) it may be possible to characterize this distribution variation and thus distinguish normal from infarcted reperfused myocardium. **Aim:** Using Homodyned K-distribution (HK) analysis we sought to determine the scatterer density in myocardium from ICE images before and after ischemia/reperfusion. **Methods:** Eight pigs were studied in an open chest balloon occlusion myocardial infarction model. Epicardial reference markers were placed on the anterior LV wall to span the area at risk and orient the ICE images. Demodulated radio frequency (I/Q) data were obtained using an 8.5 MHz phased array catheter tipped transducer in the RV cavity. The LAD was occluded for 120 min and reopened for 30 min. Repeat ICE imaging of the selected region was performed using the ICE transducer. The heart was excised and area at risk and infarct determined using Evans Blue and TTC staining. The I/Q data were reconstructed into gray-scale images and correlated with gross specimens. The scatterer density within the outlined infarct (before ischemia and after ischemia/reperfusion) was determined with the HK method. **Results:** In the infarcted region there was a significant difference in the fraction of resolution cells with scatterers ≥10 before ischemia (1.5%±1.2%) and after reperfusion (18.4%±5.3%), p<0.05. **Conclusion:** An increase in scatterer density identifies reperfused infarcted LV myocardium using analysis of ICE images.

1189-66 Intravascular Ultrasound Molecular Imaging of ICAM-1 and Fibrin in a Yucatan Miniswine Model of Early and Late Stage Atherosclerosis

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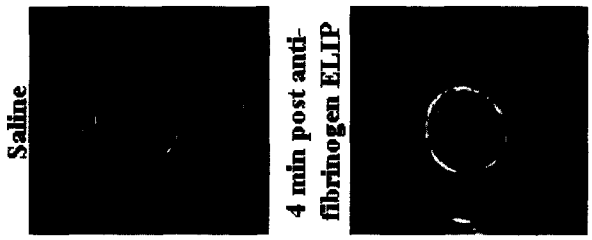
Targeted echogenic immunoliposomes (ELIP) for ultrasound detection and staging of molecular components of endothelium and atherosclerosis (ATH) have been developed. **Methods:** To determine specific ATH enhancement in Yucatan miniswine, the endothelium was denuded from one femoral and one carotid artery and the animals fed a high cholesterol diet for 2 months, to create late stage (LS) ATH. Non-denuded arteries represented early stage (ES) ATH. Femoral and carotid arteries were imaged using Intravascular ultrasound (IVUS) prior to and 5 and 15 minutes (5mg) post ELIP injection. The IVUS images were reconstructed in 3D and videodensitometric analysis of the endothelium blood interface was used to determine acoustic enhancement.
Results: Anti-ICAM ELIP enhanced the ES femoral arteries at 5 minutes vs. saline (Mean Gray Scale [MGS]: 94.9 ± 10.6 vs. 29.5 ± 5.4) p<0.001. No enhancement of the LS femoral arteries occurred. Anti-Fibrinogen ELIP enhanced the endothelium and in-situ thrombus in the LS carotid arteries vs. saline (MGS: 153 ± 7.0 vs.118 ± 6.1) p<0.001. No enhancement of the ES carotid arteries occurred. Immunohistochemistry and pathology confirmed the presence or absence of ICAM-1, fibrin and thrombus.
Conclusion: IVUS imaging of ELIP detects the expression of ICAM-1 in early stage ATH. ELIP detects fibrin and thrombus in late stage ATH. ELIP IVUS enhancement occurs within 5 minutes allowing a tool to stage ATH and tailor therapy in the catheter laboratory setting.



1189-67 Is Postsystolic Contraction a Marker of Viability After Acute Myocardial Infarction? Intracardiac Measurements of Myocardial Wall Thickness Versus Gross Histochemical Staining

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Post-systolic thickening (PST), ie, contraction during the isovolumic relaxation phase, has been proposed as a marker of viability. Intracardiac ultrasound (ICE) offers high spatial resolution to measure changes in wall thickness over the cardiac cycle. We tested in controlled experimental settings whether the magnitude of PST can estimate the regional content of viable myocardium.

Methods: Fifteen pigs were subjected to LAD occlusion (60-160min) and reperfusion (60min). An 8.5MHz phased-array intracardiac catheter was inserted into LV cavity, and repeated gray-scale M-mode images were acquired from the ischemic and normal myocardium (anterior LV wall), at baseline, during ischemia and after reperfusion. The consistency of ultrasound plane and M-mode measurements was assured by placing 2 epicardial echogenic markers on the anterior LV wall. End-diastolic (EDWT), end-systolic (ESWT) and maximum diastolic (MWT) wall thickness were measured. Calculated indexes were systolic thickening (STh), maximal thickening [MTh=(MWT-EDWT)/EDWT] and postsystolic thickening [PST=(MWT-ESWT)/ESWT]. Transmural extent of necrosis (TEN, %) was quantified from TTC-stained cardiac specimens.
Results: Based on TEN value, animals were divided in 2 groups: a nontransmural (NT; TEN=12±22%) and a transmural group (T; TEN=76±17%). During ischemia, STh and PST were not different in NT and T groups (STh: 12±22% vs. 6±8%; PST: 15±9% vs. 10±9%, respectively; p=NS for both). However, PST post-reperfusion was significantly higher in NT than T group (27±29% vs. 4±5%, respectively, p<0.001). After reflow, PST persisted in NT group but often disappeared in T group (4 out of 8 animals). STh did not recover after reperfusion (9±20% vs. 8±15%, NT vs. T, respectively; p=NS), and did not correlate with TEN. MTh was the best index to correlate with TEN (r=0.81, p<0.001), while PST was a less strong index (r=0.50, p<0.05). Conclusions: In reperfused anterior myocardial infarction, absence of both systolic and postsystolic contraction early after reperfusion indicates severely infarcted myocardium, while presence of PST indicates viability. Maximal thickening can better estimate the regional content of viable myocardium.

1189-68 Quantitative Analysis of Still-Frame Parametric Images of Left Ventricular Wall Motion

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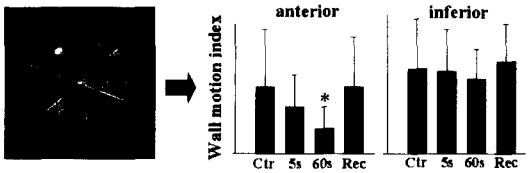
Visual assessment of LV wall motion depends on the individual reader's ability to integrate spatial and temporal information. We tested the feasibility of quantitative analysis of LV wall motion using still-frame parametric images. Methods. Integrated backscatter images (Agilent 5500, Agilent) were obtained at baseline, 5 and 60 sec after LAD occlusion, and during reperfusion in 8 anesthetized pigs. For each pixel, videointensity over 1 cardiac cycle was fitted with a sine function, and a parametric image was created by displaying its amplitude in each pixel. The LV was divided into 6 sectors. In each sector, 60 radial intensity profiles were calculated (figure, left). The integral of the mean profile was used as an index of regional wall motion. Results. In all animals, parametric images showed a bright band around the LV cavity in the area spanned by endocardial motion. Coronary occlusions resulted in a gradual decrease in the thickness and brightness of the bright band in the LAD territory, concurrent with hypokinesis noted in dynamic images. These changes resolved during reperfusion. Segments in the LAD territory showed a gradual decrease in wall motion index, with no changes noted outside LAD territory (figure, right, *p<0.05). Conclusion. Parametric imaging provides a still-frame display of regional LV wall motion sensitive enough to visualize regional hypokinesis. Computer analysis of parametric images allows quantitative evaluation of regional LV wall motion.



ORAL CONTRIBUTIONS

864 Clinical Studies of Myocardial Contrast Echocardiography

Tuesday, March 19, 2002, 2:00 p.m.-3:30 p.m.
Georgia World Congress Center, Room 255W

2:00 p.m.

864-1 Delineation of the Physiological Significance of Human Coronary Stenoses by Real-Time Myocardial Contrast Echocardiography

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Recent experimental studies have indicated that low mechanical index real-time myocardial contrast echocardiography (RT-MCE) allows to identify and quantify myocardial perfusion abnormalities produced by graded coronary stenosis (CS). To test this in humans, we studied 23 patients (64 ± 9 years) with normal left ventricular function undergoing cardiac catheterization. Rest and dipyridamole (0.84 ml/kg) power modulation RT-MCE data were compared with % luminal diameter stenosis from quantitative coronary angiography. At baseline, μbubbles velocity (β), myocardial blood volume (MBV) and myocardial blood flow (MBF) averaged 0.29 ± 0.05 cm/s, 10.1 ± 1.0% and 2.93 ± 0.6 respectively, and were similar among vascular territories with and without coronary stenosis. With dipyridamole, hyperhemic β progressively decreased with the severity of CS (from 0.74 ± 0.20, to 0.66 ± 0.12, 0.44 ± 0.10 and 0.34 ± 0.09 cm/s, in <50%, 50-70%, 70-90%, and